UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 92052

CSAH NO. 19

OVER THE

NORTH FORK CROW RIVER

DISTRICT 3 – STEARNS COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 92052 consisted of the East and West Abutments and Pier 1. The timber components of the substructure units were found to be in satisfactory to fair condition with random checking and outer shell cracking observed on all of the timber piles. All of the timber braces of Pier 1 exhibited up to 15 percent section loss from 1 foot above the waterline to below the waterline. Four of the diagonal braces of the pier were also broken and/or split. One of the interior piles of the East Abutment exhibited moderate to heavy decay of the surface layer, with up to 2 inches of penetration into the pile. A moderate accumulation of timber debris was observed across the entire upstream fascia of the bridge. The channel bottom around the substructure units consisted of a soft silt and cobbles that appeared to be stable with no significant scour at the time of the inspection.

INSPECTION FINDINGS:

(A) All of the timber piles exhibited approximately 5 percent section loss near the waterline. In addition, the piles exhibited up to 1/8 inch wide vertical outer shell cracking extending the full height of the piles and penetrations up to 1/4 inch deep around the waterline.

(B) Four of the diagonal braces at the pier were broken below the waterline and were no longer engaged to the timber piles.

(C) The fourth timber pile from the upstream end of the East Abutment exhibited delamination and outer shell cracking from the waterline to the channel bottom with up to 2 inches of penetration.

(D) A moderate accumulation of timber debris, consisting of up to 2 foot diameter logs, was observed along the entire upstream fascia below water.

RECOMMENDATIONS:

(A) Replace the broken and/or split diagonal braces during future maintenance operations. Monitor the decayed pile at the East Abutment during future inspections, and if found to be progressing, remedial measures may then be warranted.

(B) Monitor the accumulation of timber debris at the bridge, and if found to be progressing, removal operations may be warranted at that time.

(C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Daniel G. Stromberg

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 92052

Feature Crossed: North Fork Crow River

Feature Carried: CSAH No. 19

Location: District 3 – Sterns County

Bridge Description: The superstructure consists of a two span, timber slab bridge supported by a timber pile center pier and two timber pile abutments.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 19, 2007

Weather Conditions: Partly Cloudy, 50 °F

Underwater Visibility: 0.5 Feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments and Pier 1

General Shape: The East and West Abutments are constructed of timber piles with timber plank backwalls and wingwalls. The center pier consists of six timber piles braced with diagonal timber plank bracing.

Maximum Water Depth at Substructure Inspected: Approximately 7.5 Feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap at the downstream end of Pier 1.

Water Surface: The waterline was approximately 6.5 feet below reference. Assumed Waterline Elevation = 93.5.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code U/02

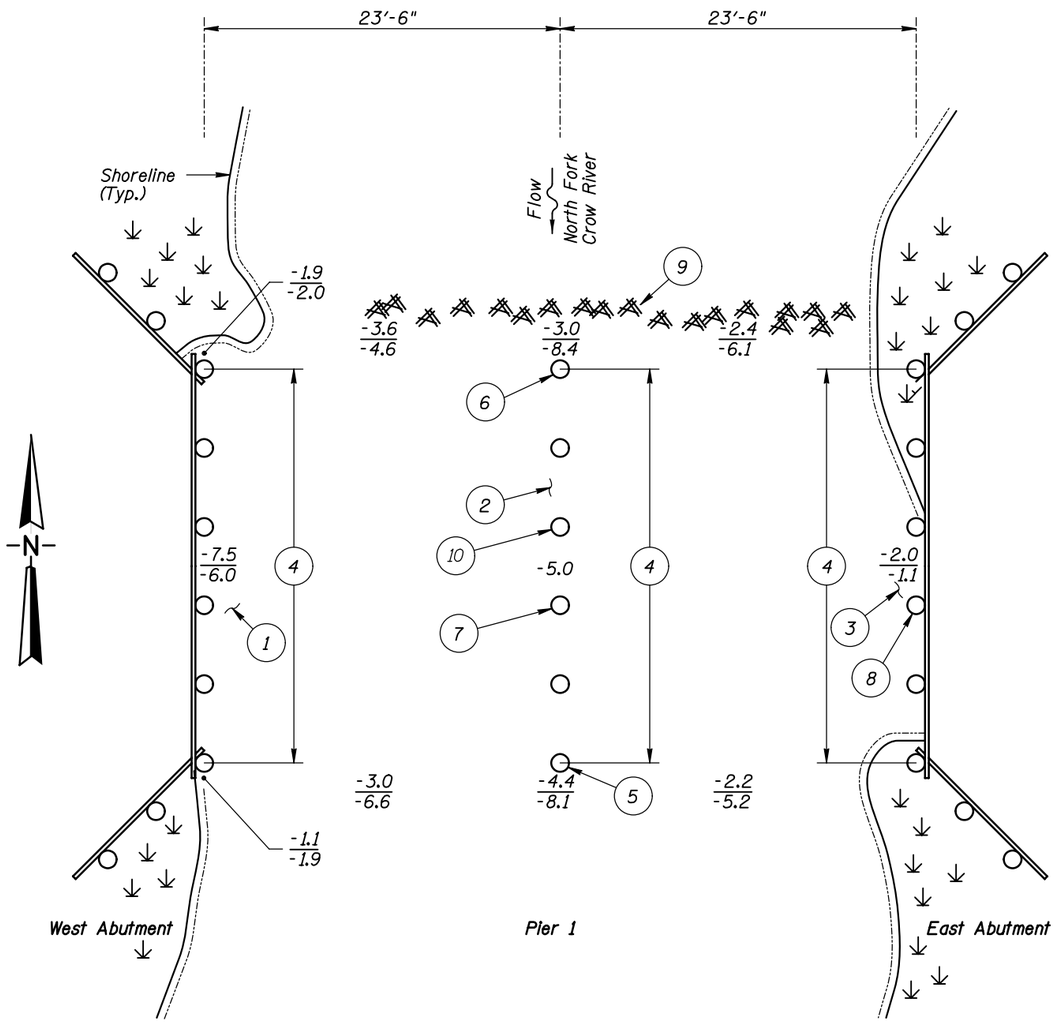
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

X Yes _____ No

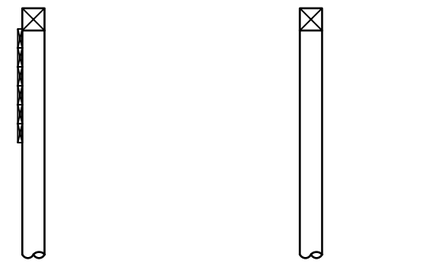
Photograph 1. View of Pier 1, Looking Northwest.

Photograph 2. Overall View of East Abutment, Looking Northeast.

Photograph 3. Overall View of West Abutment, Looking Northwest.



SOUNDING PLAN



TYPICAL END VIEW OF ABUTMENTS
(E. Abutment Opp. Hand)

TYPICAL END VIEW OF PIER

GENERAL NOTES:

1. The East and West Abutments and Pier 1 were inspected underwater.
2. At the time of inspection on October 19, 2007 the waterline was located approximately 6.5 feet below the top of the pile cap at the downstream end of Pier 1. Since insufficient bridge elevation information was available a reference elevation of 100.0 was assumed. Based on the assumed reference the waterline elevation was 93.5.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at the mid points between the substructure units.

INSPECTION NOTES:

(1) The channel bottom at the West Abutment consisted of cobbles 1 foot in diameter and smaller and silt with up to 6 inches of probe rod penetration. At the middle of the abutment, the channel bottom consisted of firmer sand.

(2) The channel bottom at Pier 1 consisted of silty sand with up to 1 foot of probe rod penetration.

(3) The channel bottom at the East Abutment consisted of cobbles and silt with up to 1 foot of probe rod penetration and riprap 1 foot in diameter and smaller.

(4) All timber piles exhibited approximately 5 percent section loss near the waterline with up to 1/8 inch wide vertical outer shell cracking extending the full height of the piles with penetrations up to 1/4 inch deep near the waterline.

(5) The diagonal brace was broken/split below the waterline and was no longer engaged to the downstream pile at the pier. Overall, split was 5 to 6 feet long. The bracing was missing 50 percent of the member on the last 2 feet of the bracing.

(6) The diagonal brace was broken below the waterline and was no longer engaged to the upstream pile at the pier. The bracing was missing 75 percent of the member on the last 3 feet of the bracing.

(7) The diagonal brace was broken below the waterline and was no longer engaged to the pile at the pier. The bracing was missing 90 percent of the member on the last 3 feet of the bracing.

(8) The timber pile exhibited decay, delamination, and outer shell cracking from the waterline to the channel bottom with up to 2 inches of penetration.

(9) A moderate accumulation of timber debris, including 2 foot diameter logs, was observed along the entire upstream fascia below the water.

(10) The diagonal brace exhibited several 1/2 inch wide splits with one of them going through the connection.

Legend

-8.0 / -8.0	Sounding Depth (9/19/07) / Sounding Depth (9/28/02)
○	Timber Pile
	Timber Debris
↓	Grassy Vegetation

Note:

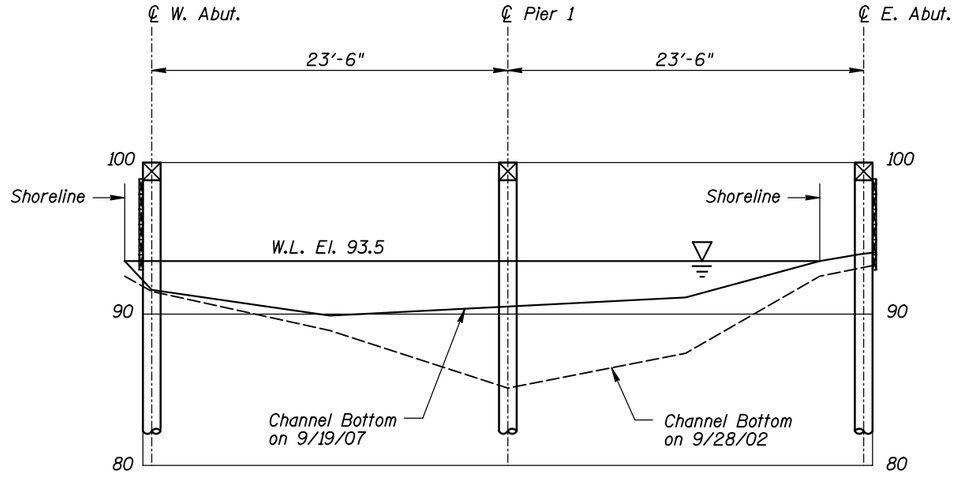
All soundings based on 2007 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

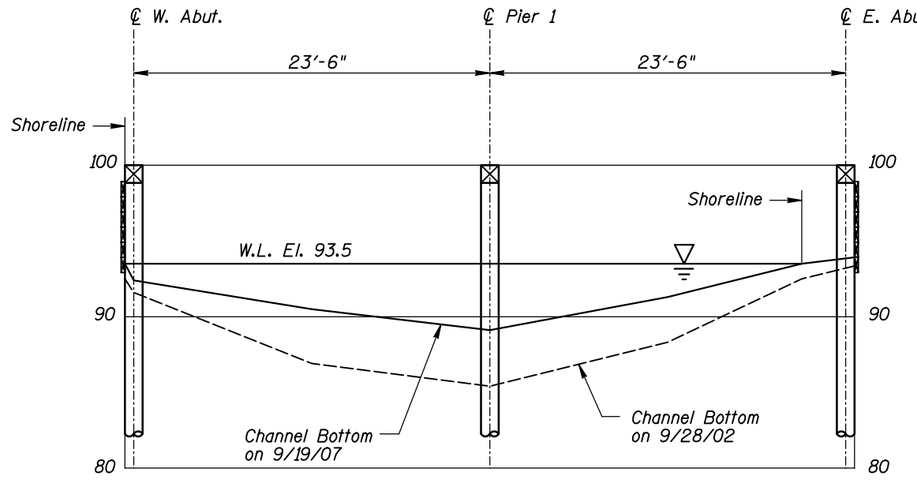
STRUCTURE NO. 92052
OVER THE NORTH FORK OF THE CROW RIVER
DISTRICT 3, STEARNS COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT., 2007
Checked By: MDK		Scale: NTS
Code: 522192052		Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:

Refer to Figure 1 for General Notes.

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UNDERWATER BRIDGE INSPECTION

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UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, Il. 60606 (312) 704-9300 www.collinsengr.com	Date: OCT., 2007
Checked By: MDK		Scale: 1"=10'
Code: 522192052		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 19, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 92052 WEATHER: Cloudy, 50 °F

WATERWAY CROSSED: North Fork Crow River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER _____

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 3:50 P.M.

TIME OUT OF WATER: 4:20 P.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY 0.5 feet

DEPTH 7.5 feet maximum at West Abutment

ELEMENTS INSPECTED: East and West Abutments and Pier 1

REMARKS: Overall, the timber piles and braces of the East and West Abutments and Pier 1 were in satisfactory to fair condition, with up to 1/8 inch wide checks and with 1/8 to 1/4 inches of penetration, extending from the top of the piles down to the mudline on all of the timber piles of the substructure units. All of the piles also exhibited minor localized section loss around the waterline. Four diagonal braces of the pier were broken and/or split below the waterline at the pile connection. In addition, the fourth pile from the north end of the East Abutment exhibited significant decay of the exterior layer of the pile, which was soft and spongy with approximately 2 inches of penetration. A moderate accumulation of timber debris was observed extending across the entire upstream fascia of the bridge below water.

FURTHER ACTION NEEDED: ___X___ YES _____ NO

Replace the broken and/or split diagonal braces during future maintenance operations. Monitor the decayed pile at the East Abutment during future inspections, and if found to be progressing, remedial measures may then be warranted.

Monitor the accumulation of timber debris at the bridge, and if found to be progressing, removal operations may be warranted at that time.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 92052
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED North Fork Crow River

INSPECTION DATE October 19, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	East Abutment	2.0’	5	6	N	9	N	6	8	N	N	6	6	N	N	5	N	N	N
	Pier 1	5.0’	6	N	N	9	N	6	8	N	N	6	6	N	N	6	N	N	N
	West Abutment	7.5’	6	6	N	9	N	6	8	N	N	6	6	N	N	6	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the timber piles and braces of the East and West Abutments and Pier 1 were in satisfactory to fair condition, with up to 1/8 inch wide checks and with 1/8 to 1/4 inches of penetration, extending from the top of the piles down to the channel bottom on all of the timber piles of the substructure units. All of the piles also exhibited minor localized section loss around the waterline. Four diagonal braces of the pier were broken and/or split below the waterline at the pile connection. In addition, the fourth pile from the north end of the East Abutment exhibited significant decay of the exterior layer of the pile, which was soft and spongy with approximately 2 inches of penetration. A moderate accumulation of timber debris was observed extending across the entire upstream fascia of the bridge below water.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.